Appendix 1: Silvicultural Prescription:

Plentywater Analysis Area

Preparer: Bill Wais **Date**: 12/00

Location:
Legal: T.2N, R.3W, Sec. 3 & 9, T.3N, R.3W, Sec. 21, 27, 29, 33, W.M.
T.2N, R.2W, Sec. 7, 15, 17, 21, W.M.
County: Washington and Multnomah
Watershed: The proposed treatment areas are located in both the Dairy Creek and McKay Creek watersheds. A watershed analysis was completed for these areas in 1999.

Treatment Units:
- 03-1 **B** 44 acres of regeneration
- 03-2 **B** 50 acres of regeneration
- 03-3 **B** 24 acres of thinning
- 09-1 **B** 16 acres of regeneration
- 21-1 **B** 40 acres of regeneration/hardwood conversion and 29 acres of thinning
- 27-1 **B** 5 acres of regeneration and 110 acres of thinning
- 29-1 **B** 38 acres of thinning
- 33-1 **B** 12 acres of regeneration
- 21-2 **B** 26 acres of regeneration
- 21-3 **B** 20 acres of regeneration
- 17-1 **B** 20 acres of thinning
- 15-1 **B** 40 acres of regeneration and 18 acres of thinning
- 07-1 **B** 52 acres of thinning

RMP Land-Use Allocation: Matrix/GFMA with some Riparian Reserves

The objectives specified in the Salem District RMP on page 20 for this land use allocation are:

- **$** Produce a sustainable supply of timber and other commodities to provide jobs and contribute to community stability.
- **$** Provide connectivity (along with other allocations such as Riparian Reserves) between Late Successional Reserves.
- **$** Provide habitat for a variety of organisms associated with both late-successional and younger forests.
- **$** Provide for important ecological functions such as dispersal of organisms, carryover of some species from one stand to the next, and maintenance of ecologically valuable structural components such as down logs, snags, and large trees.
- **$** Provide early successional habitat.

Meeting these objectives will also help to meet the planned timber sale volume for the Tillamook Resource Area PSQ (Probable Sale Quantity).

Forest Diseases and Insects (General)

Laminated Root Rot: Laminated Root Rot, caused by the fungus *Phellinus weirii (PW)* has been found in varying degrees throughout the analysis area. *PW* destroys the root systems of Douglas-fir and grand fir, reducing structural stability, root hydraulic function, and tree growth. Over the course of a rotation of timber, *PW* infection can decrease Douglas-fir volume production by as much as 40% - 70%, when compared to uninfected stands (Thies and Sturrock, 1966). This pathogen is a facultative saprophyte, and persists in the soil for at least 50 years in the roots and stumps of dead trees (Hadfield et al., 1986, Thies and Sturrock, 1995). The disease spreads when the uninfected roots of a susceptible tree species comes in contact with infected roots or stumps (Hadfield et al., 1986, Thies and Sturrock, 1995). Therefore, the presence of *PW* may limit both potential stand treatments and the tree species utilized for reforestation. Douglas-fir and grand fir are highly susceptible, western redcedar is resistant, western hemlock is tolerant, and hardwoods are immune to the disease (Thies and Sturrock, 1994). *PW* infection can directly kill Douglas-fir trees or it can stress a tree and predispose it to attack by a secondary agent such as the Douglas-fir bark beetle (*Dendroctonus pseudotsugae*).

Douglas-fir bark beetle: The Douglas-fir beetle is a common secondary agent that kills Douglas-fir trees approximately 12 inches dbh and larger that typically are weakened by some other insect or pathogen. This beetle usually infests disease weakened trees and fresh down logs for brood development, however, if large amounts of down wood become available the population levels may grow to the point that adults will attack and kill healthy trees (Hostetler and Ross, 1996).

Armillaria spp.: *Armillaria* root disease commonly attacks weakened, suppressed understory trees. This disease can also lead to secondary infection or infestation by the Douglas-fir beetle.

Swiss Needle Cast: Swiss needle cast (SNC) is caused by the native fungi *Phaoecryptopus gaumanni*, that infects Douglas-fir needles causing decreases in stomatal conductivity and eventual needle loss and growth reduction. Swiss needle cast currently is a major problem in the coastal fog belt, and disease severity appears to be increasing throughout northwestern Oregon west of the Cascades. SNC has not been identified in the specific units in the Plentywater analysis area at this time. Levels of SNC infection appear to be low to moderate in the Douglas-fir plantations throughout the general area. The presence of SNC should be considered when recommending treatments in stands comprised of susceptible species and in reforestation prescriptions.

Effects of No Action Within Stands Proposed for Thinning

There are approximately 325 acres of young, densely stocked stands that are proposed for thinning. This total includes about 30 acres of Riparian Reserves. In general, with no treatment at this time, individual tree growth within these stands would decline as competition for the sites:

resources (most notably soil moisture, nutrients, light, crown space, and root space) become increasingly intense. Trees which are currently in subordinate canopy positions would be most affected in future years. The live crowns of these trees in particular would continue to recede as the stands become more crowded. Mortality of the shorter trees with the smallest live crowns would increase over the next several decades. Competition induced mortality would be manifested in a variety of ways including: the simple inability of trees with limited crown size and root structure to obtain enough of the critical resources on site to survive, stem buckling caused by a low diameter: height ratio, wind throw as a result of limited root systems, and Douglas-fir bark beetle infestations. Snags and coarse woody debris would increase over the next few decades, but the supply would be coming from the smallest diameter trees and would, therefore, be of limited value and duration. Without a thinning treatment, the average tree diameter over the course of the next several decades would be dramatically smaller in these stands when compared to what would be attained with the proposed thinnings. From an economic viewpoint, without the proposed thinning treatment, opportunities to utilize wood fiber from trees which are generally projected to die in the relatively near future and to provide jobs for the local economy would be forgone.

Effects of No Action Within Stands Proposed for Regeneration Harvest

There are approximately 250 acres of stands proposed for regeneration harvest. With no treatment, these stands would continue to produce timber yields far below their potential for the next several decades. The existing conifers, which are generally in a dominant or co-dominant position, would be free to continue to grow and develop relatively large crowns and root systems. The exception to this situation would be in areas infected with laminated root rot, where the existing conifers will likely decline and die over the next couple of decades. In much of these stands where large relatively old hardwoods currently exist, these trees would start dying over the next several decades and create holes in the canopy large enough to allow the development of another layer of trees, which could be composed of either conifers or hardwoods. In either case, the resulting stand would consist of large scattered Douglas-firs over a shorter layer of Douglas-fir, hardwoods or a mixture.

Effects Within Stands Following the Proposed Thinning Treatment

Approximately 325 acres would be commercially thinned. Included in this total would be about 30 acres of Riparian Reserves. Within these stands, trees in the subordinate crown classes and trees with the smallest live crowns would be harvested. Following this treatment, there would be very little inter-tree competition for the available site resources over the next two decades. The remaining trees would be free to grow with adequate space available for rapid crown and root expansion, and utilization of the available soil moisture, nutrients, and light would be optimized. The result would be a considerable increase in the growth rates of the trees, with the production of larger trees in a shorter time frame with longer, wider crowns, and more wind firmness. Into the second decade following the proposed treatment, inter-tree competition should again begin to develop and the need for another treatment should then be analyzed. From an economic point of view, with the proposed thinning implemented, mainly trees anticipated to die over the next

several decade would be sold, the wood fiber utilized, and jobs created for the local economy.

Effects Within Stands Following the Proposed Regeneration Harvests

Approximately 250 acres would have a regeneration harvest. Following treatment within these stands, there would be a range of about 6 to 15 of the largest conifers per acre remaining. In some cases where there are not that many conifers currently existing, larger hardwoods would be substituted as conifer leave trees. These leave trees are intended to serve a variety of functions including: provide another canopy layer in the regenerated stand, wildlife habitat, a source for future snags, and a source for future coarse woody debris. As needed, some of these trees would be made into snags. Others would blow over. Many of these trees would continue to grow and survive for many decades. These areas would be planted with a mixture of conifer species to create the regenerated stands. Areas infected with laminated root rot would be planted with non-susceptible species. Competing vegetation would be controlled to allow these planted trees to grow quickly and develop into thrifty young timber stands. Within two to three decades, annual cubic foot conifer timber yields would far exceed current levels in these stands.

Silvicultural Prescription

Unit: 3-1 & 3-2 Date: 9/00
Legal Description: T2N,R3W,S3 Acres: ~188
Site Index: 122 Land Designation: GFMA/RR
Riparian Reserve Width: 200 ft

Unit Summary

Species	TPA	QMD (Inches)	BA/Ac	SDI	RD	Bd Ft/Ac	Cubic Ft/Ac
DF	66	18	111		27	21,266	3,976
Maple	28	16	38		9	7,319	1,426
Alder	52	12	42		12	6,970	1,423
Cedar	17	17	26		6	2,886	661
Hemlock	6	13	6		2	977	206
Total	170	16	228	360	58	40,457	7,885

Objectives:
1) Increase timber yields by regenerating the portions of the unit with low conifer stocking and high stocking levels of hardwoods. Establish a well-stocked, thrifty plantation dominated by conifer species.

Stand Conditions:
These units are composed of a 70 year old mixed conifer and hardwood stand. Conifer stocking levels are low, which is resulting in much lower timber yields than this area is capable. *PW* is prevalent throughout the stands, which limits treatment options. Overall, the unit is comprised of 41% Douglas-fir, 30% red alder, 16% bigleaf maple, and 9% western redcedar. There is an average of about 1 snag per acre over 20 inches in diameter. Down logs total an average of 318 lineal feet per acre.

The understory vegetation is fairly well developed. The primary shrub species are vine maple, hazel, elderberry. The primary herb species are sword fern and dwarf Oregon grape.

Soils are composed of the Kinton and Saum series. The Kinton series is characterized by a fine silty loess over old alluvium and fragipan. It is a relatively deep, well-drained soil. The Saum

series is a fine silty loess/alluvium over residuum weathered from basalt. It is also relatively deep and well-drained.

This unit is generally quite flat, with slopes from 0 to 10%. The exception is in the NE portion of the unit, where there are some areas with 40 to 70% slopes.

Prescription:
Regeneration cut, leaving 6 to 8 of the largest conifers per acre. In areas where there are not sufficient numbers of conifers larger than 20 dbh, substitute hardwoods. Create 1 conifer snag per acre. Retain existing coarse woody debris. Establish 200 foot buffers around S & M mollusk sites. This harvest should yield approximately 12 -15 MBF per acre in conifer volume. Handpile and burn or swamper burn slash in designated areas along Pumpkin Ridge Road, the north property line of unit 3-1, the east property line of unit 3-1, the east boundary of unit 3-2, part of the south boundary of unit 3-2, and the landing piles. Cut and lop any standing unmerchantable sized hardwoods and brush. Lop logging slash. Plant a mix of DF, WRC, and hemlock, concentrating the cedar in root rot areas. Manually release crop trees in years 1 to 3 as necessary. Precommercial thin as necessary.

Silvicultural Prescription

Unit: 3-3 Date: 9/00
Legal Description: T2N,R3W,S3 Acres: ~24
Site Index: 122 Land Designation: GFMA/RR
Riparian Reserve Width: 200 ft

Unit Summary

Species	TPA	QMD (Inches)	BA/Ac	SDI	RD	Bd Ft/Ac
DF	210	13	200	319	61	39,634
Cedar	55	13	62	84	16	13,488
Hemlock	33	13	31	50	10	6,450
Total	298	13	293	453	87	59,572

Objectives:
1) Commercially thin from below in order to increase radial growth rates, capture anticipated tree mortality, increase crown size, and promote the general health and vigor of the stand.

2) In addition to meeting the Aquatic Conservation Strategy Objectives, the thinning treatments in the riparian reserves would attempt to:

- **$** Increase the vigor and radial growth of residual trees, thereby developing larger sized trees in a quicker time frame.
- **$** Increase live crown size.
- **$** Increase root system stability.
- **$** Increase vertical stand structure by allowing some trees to develop a greater degree of dominance over others.

Stand Conditions:
This unit is composed of a fairly densely stocked 60 year old Douglas-fir stand, with a hardwood understory. Radial growth rates are slowing, live crowns are receding, and significant mortality has been occurring for the past 10+ years. Existing snags are generally 10 inches in diameter and smaller.

The understory vegetation is fairly well developed. The primary shrub species are vine maple, hazel, and elderberry. The primary herbaceous species are sword fern and dwarf Oregon grape.

Soils are composed of the Kinton and Saum series. The Kinton series is characterized by a fine silty loess over old alluvium and fragipan. It is a relatively deep, well-drained soil. The Saum series is a fine silty loess/alluvium over residuum weathered from basalt. It is also relatively deep and well-drained.

This unit is generally quite flat, with slopes from 0 to 10%.

Prescription:

Thin from below to a residual BA of approximately 125 sq. ft. or 120 trees/acre , removing the suppressed, intermediate, and a portion of the co-dominant crown class trees. This harvest should yield approximately 15 to 20 MBF per acre.
50 foot buffer around the S & M mollusk site and leave all hardwoods within a 200 foot radius.
Within the Riparian Reserves, maintain a 50 foot no cut buffer, retain all hardwoods, and mark trees to achieve an uneven residual spacing.
Handpile and burn or swamper burn slash in designated areas along the east property line. Burn landing piles.

Silvicultural Prescription

Unit: 9-1 Date: 10/00
Legal Description: T2N,R3W,S9 Acres: ~16
Site Index: 124 (King) Land Designation: GFMA
Riparian Reserve Width: 190 ft

Unit Summary
Area A

Species	TPA	QMD (Inches)	BA/Ac	SDI	RD	Bd Ft/Ac	Cubic Ft/Ac
DF	62	21	147		32	36,662	6,226
OGDF	2	35	10		2	2,845	431
WR Cedar	23	17	35		8	4,709	1,031
BL Maple	48	11	31		9	6,094	1,122
Total	176	16	243		61	53,069	9,447

Objectives:

1) Reforest root rot infection centers with tree species resistant to laminated root rot.
2) Increase timber yields by converting hardwood stands and understocked mixed conifer/hardwood stands into well-stocked conifer dominated plantations.

Stand Conditions:

This unit is dominated by an overstory of poorly stocked DF and some cedar. There a few old residual DF that are over 100 years old, but in general the overstory varies from about 50 to 65 years old. The understory layer is primarily composed of bigleaf maple and vine maple. Average crown closure is about 80%. Laminated rot root is present in the stand, with some old infection areas which are now dominated by big leaf maple.

Brush and herbaceous species cumulatively cover about 75% of the land surface. Brush species include: vine maple and salal. Herbaceous species include: sword fern and dwarf Oregon grape.

The soils are composed of the Cornelius series. These soils are fine silty loess over alluvium and fragipan, beginning at 30 to 40" and extending to 60". It is considered to be moderately well drained. Slopes vary from about 10 to 25%.
The stand exams show no existing snags or coarse woody debris over 20" in diameter.

Prescription:
Regeneration cut, leaving 6 to 8 overstory conifers per acre for green tree retention requirements, plus an additional 1 to 2 of the largest conifers per acre for snag recruitment, and another 4 trees per acre over 26" dbh for coarse woody debris recruitment. The coarse woody debris requirement of 240 lineal feet would be met based on an analysis of tree taper tables which shows that each tree left over 26" dbh would provide 60 lineal feet. This harvest should yield approximately 25 MBF per acre of conifer volume. Handpile and burn or swamper burn slash in designated areas along the north property boundary, Oliver Hill Road, and along the roads on the southeast side of the unit. Burn landing piles. Plant a mixture of DF, grand fir, western redcedar, and western hemlock.

Silvicultural Prescription

Unit: 21-1 Date: 9/00
Legal Description: T3N,R3W,S21 Acres: ~69
Site Index: 119 (King) Land Designation: GFMA
Riparian Reserve Width: 200 ft

Unit Summary
Area A

Species	TPA	QMD (Inches)	BA/Ac	SDI	RD	Bd Ft/Ac	Cubic Ft/Ac
DF	211	13.5	209		57	39,555	7,435
BL Maple	39	10	22		7	3,532	702
R Alder	7	12	6		2	565	133
WR Cedar	1	24	3		1	470	101
Total	259	13	240	355	66	44,122	8,371

Area B

Species	TPA	QMD (Inches)	BA/Ac	SDI	RD	Bd Ft/Ac	Cubic Ft/Ac
DF	77	16	109		27	21,523	3,809
R.Alder	100	11	63		19	8,404	1,807
BL Maple	52	13	51		14	9,554	1,861
Total	229	13	223	365	61	39,481	7,477

Area C

Species	TPA	QMD (Inches)	BA/Ac	SDI	RD	Bd Ft/Ac	Cubic Ft/Ac
DF	172	11	109		33	14,416	2,934
R.Alder	158	8	58		20	7,978	1,678
BL Maple	54	9	22		8	2,524	561
Total	385	9.5	189	355	61	24,919	5,172

Objectives:

1) Commercially thin from below in order to increase radial growth rates, capture anticipated tree mortality, increase crown size, and promote the general health and vigor of the stand.
2) Remove pockets of trees infected with laminated root rot and a margin of trees around them in order to help keep the spread of this disease in check.
3) Reforest infection centers with tree species resistant to laminated root rot.
4) Increase timber yields by converting hardwood stands and understocked mixed conifer/hardwood stands into well-stocked conifer dominated plantations.

Stand Conditions:
Area A
This portion of the unit is dominated by densely stocked DF, about 60 years old. It has an understory layer which is primarily bigleaf maple, red alder and western redcedar. Average crown closure is about 80%. The DF in the overstory have live crowns which are receding and radial growth rates which are declining.

Brush and herbaceous species cumulatively cover about 75% of the land surface. Brush species include: vine maple, hazel, huckleberry, and ocean-spray. Herbaceous species include: sword fern, dwarf Oregon grape, and salal.

The soils are composed of the Olyic and Goble series. The Olyic series is a fine loam overlying basalt 40 to 60 inches deep. It is considered to be well drained. The Goble series is a fine silty loess over old alluvium and fragipan. Depths range up to about 60 inches and it is considered to be moderately well drained. Slopes range from moderate to steep, from about 30% to 70%.

There is an average of approximately 8 snags per acre, but they are under 17 inches in diameter.

Decay Class 1 & 2 coarse woody debris over 20 inches in diameter total 24 pieces and 836 feet per acre.

Prescription:
Commercial thin from below, removing the suppressed, intermediate, and a portion of the co-dominant crown classes to a residual basal area of 145 sq. ft. and about 137 trees/acre. In the laminated root rot pockets, remove all conifers except western redcedar, plus bridge cut one tree width outside of the infection area. Establish 50 foot radii no- cut buffers around the S & M mollusk sites, and retain all hardwoods within 200 foot radii. Total harvest volume from this portion of the unit should be approximately 10 MBF/ac. Handpile and burn or swamper burn slash in designated areas along the north and west property boundaries, along BLM roads 3N-3-21 and 3N-3-21-1, and along the property boundary in the NE 1/4 of the SW 1/4. Burn landing piles. Plant the infection centers with western redcedar and red alder.

Stand Conditions:
Area B
This portion of the unit is dominated by an overstory of relatively under-stocked DF, about 55 years old. It has an understory layer which is primarily red alder and bigleaf maple. Average crown closure is about 80%. There is evidence of laminated root rot in the overstory DF, with recent snags and blowdown, as well as trees with declining crown conditions.

Brush and herbaceous species cumulatively cover about 75% of the land surface. Brush species include: vine maple, hazel, huckleberry, and ocean-spray. Herbaceous species include: sword fern, dwarf Oregon grape, and salal.

The soils are composed of the Olyic and Goble series. The Olyic series is a fine loam overlying basalt 40 to 60 inches deep. It is considered to be well drained. The Goble series is a fine silty loess over old alluvium and fragipan. Depths range up to about 60 inches and it is considered to be moderately well drained. Slopes are relatively flat and range from 0 to 15%.

There is an average of approximately 16 snags per acre, but they are under 20 inches in diameter. Decay Class 1 & 2 coarse woody debris over 20 inches in diameter total 24 pieces and 836 feet per acre.

Prescription:
Regeneration harvest, leaving 6 to 8 of the largest conifers per acre for green tree retention, plus 1 to 2 conifers for snag recruitment. Total harvest volume from this area should be approximately 14 MBF/ac. Slash brush species greater than 2 feet in height. Broadcast burn. If fuel loading is lower than expected, handpile and burn or swamper burn in designated areas along the north and east property boundaries and along BLM road 3N-3-21. If broadcast burning is implemented, protect S & M mollusk sites. Burn landing piles. Plant the infection centers with western redcedar and red alder. Plant the remaining area with a mix of DF, western hemlock, and western redcedar.

Stand Conditions:
Area C
This portion of the unit is dominated by red alder and bigleaf maple. Much of the area is almost pure hardwoods with a few scattered DF. The understory layer is composed of brush and herbaceous species. Average crown closure is about 90%.

Brush and herbaceous species cumulatively cover about 75% of the land surface. Brush species include: vine maple, hazel, huckleberry, and ocean-spray. Herbaceous species include: sword fern, dwarf Oregon grape, and salal.

The soils are composed of the Olyic and Goble series. The Olyic series is a fine loam overlying basalt 40 to 60 inches deep. It is considered to be well drained. The Goble series is a fine silty loess over old alluvium and fragipan. Depths range up to about 60 inches and it is considered to be moderately well drained. Slopes are relatively moderate and range from 5 to 25%.

There is an average of approximately 41 snags per acre, but they are under 20 inches in diameter. Decay Class 1 & 2 coarse woody debris over 20 inches in diameter total 24 pieces and 836 feet per acre.

Prescription:
Regeneration harvest. Leave up to 6 to 8 conifers per acre where possible for green tree retention, plus 1 to 2 conifer per acre for snag recruitment. In other areas where there are currently less than 6 -8 conifers per acre, leave any conifers plus a few hardwoods associated in clumps. Total harvest volume in this area should be approximately 12 MBF/ac. Handpile and burn or swamper burn slash in designated areas along the north property boundary and along BLM road 3N-3-21. Plant with a mixture of DF, western redcedar and western hemlock.

Silvicultural Prescription

Unit: 27-1 Date: 9/00
Legal Description: T3N,R3W,S27 Acres: ~115
Site Index: 120 (Kings) Land Designation: GFMA/RR
Riparian Reserve Width: 200 ft

Unit Summary

Species	TPA	QMD (Inches)	BA/Ac	SDI	RD	Bd Ft/Ac	Cubic Ft/Ac
DF	232	15	267		70	47,800	9,014
Alder	5	14	6		2	1,132	228
Total	237	15	273	453	70	48,932	9,242

Objectives:
1) Increase timber yields by regenerating the portions of the unit with low conifer stocking, high stocking levels of hardwoods, and a high incidence of *P.W.* Establish a well-stocked, thrifty plantation dominated by *P.W.* resistant species.

2) In the portions of the unit with young densely stocked small DF sawtimber, commercially thin from below in order to increase radial growth rates, capture anticipated tree mortality, increase crown size, and promote the general health and vigor of the stand.

3) In addition to meeting the Aquatic Conservation Strategy Objectives, the thinning treatments in the riparian reserves would attempt to:

- **$** Increase the vigor and radial growth of residual trees, thereby developing larger sized trees in a quicker time frame.
- **$** Increase live crown size.
- **$** Increase root system stability.
- **$** Increase vertical stand structure by allowing some trees to develop a greater degree of dominance over others.

Stand Conditions:
This unit is composed of two distinct stand types. The majority of the area is Stand Type A,

which is a 60 year old Douglas-fir stand of small sawtimber. Stocking levels are high which is resulting in decreasing radial growth, receding live crowns, and mortality in primarily the smaller trees. Stand Type B is a mixed stand of 60 year old Douglas-fir and hardwoods with a high incidence of *P.W.* Conifer stocking levels are low, which is resulting in much lower timber yields than this area is capable. Recent mortality of DF in pockets caused by *P.W.* has been occurring. There is an average of about .5 snag per acre over 20 inches in diameter. There is virtually no down wood over 20" in decay classes 1 and 2.

The understory vegetation is fairly well developed. The primary shrub species are vine maple, red huckleberry, and ocean spray. The primary herb species are sword fern, salal, and dwarf Oregon grape.

Soils are composed of the Cascade, Goble, and Laurelwood series. The Cascade series is characterized as a fine silty loess over old alluvium and fragipan. It is a relatively deep, but somewhat poorly drained. The Goble series is a fine silty loess over old alluvium and fragipan. It is also relatively deep and moderately well-drained. The Laurelwood series is a fine silty loess overlying a moderately fine textured subsoil. It is relatively deep and well drained.

The topography in this unit varies from virtually flat in the northeast and northwest portions to slopes ranging from about 35 to 50%.

Prescription:

Thin from below in Stand Type A to a residual BA of approximately 140 sq. ft. or about 86 trees per acre, removing the suppressed, intermediate, and a portion of the co-dominant crown class trees. Within the Riparian Reserves, maintain a 50 foot no cut buffer, leaving all hardwoods, attaining an uneven spacing between leave trees, and retaining any trees cut for skyline corridors. Handpile and burn or swamper burn slash in designated areas along the south and west property boundaries of the SW 1/4 of the NE 1/4 and along the west property boundary of the SE 1/4 of the NE 1/4. Burn landing piles. In the skyline corridors cut in the Riparian Reserve, evaluate for the need to plant shade tolerant tree species.
Regeneration cut in Stand Type B, leaving approximately 6 to 8 of the largest conifers per acre for green tree retention, plus 1 to 2 trees for snag recruitment.
This harvest should yield an average of approximately 14 MBF per acre in both stand types. In the regeneration area, slash brush species greater than 2 feet in height. Cut holes in slash with chainsaws as necessary to accommodate planting. Plant a mix of DF, hemlock, and western red cedar.

Silvicultural Prescription

Unit: 29-1 Date: 9/00
Legal Description: T3N,R3W,S29 Acres: ~38
Site Index: 134 (King) Land Designation: GFMA/RR
Riparian Reserve Width: 220 ft

Unit Summary

Species	TPA	QMD (Inches)	BA/Ac	SDI	RD	Bd Ft/Ac	Cubic Ft/Ac
DF	224	12	183		52	26,197	5,324
Maple	35	9	16		5	1,791	401
Alder	10	11	7		2	909	190
Total	269	12	205	360	60	28,896	5,915

Objectives:

1) Commercially thin from below in order to increase radial growth rates, capture anticipated tree mortality, increase crown size, and promote the general health and vigor of the stand.

2) In addition to meeting the Aquatic Conservation Strategy Objectives, the thinning treatments in the riparian reserves would attempt to:

- **$** Increase the vigor and radial growth of residual trees, thereby developing larger sized trees in a quicker time frame.
- **$** Increase live crown size.
- **$** Increase root system stability.
- **$** Increase vertical stand structure by allowing some trees to develop a greater degree of dominance over others.

Stand Conditions:
This stand is composed of densely stocked DF, about 30 years old. It has an understory layer which is primarily bigleaf maple and red alder. The DF in the overstory have live crowns which are beginning to recede and radial growth rates which are declining. Canopy cover averages approximately 80%.

Brush species cumulatively amount to 8% cover and include huckleberry, vine maple, hazel, and ocean-spray. Herbaceous species cover about 35% and include dwarf Oregon grape and sword fern.
The soils are the Olyic series, which is a fine loam overlying basalt 40 to 60 inches deep. It is considered to be well drained. Slopes are relatively moderate ranging from about 10% to 30%.

Given the past treatments and young age of this stand, there are virtually no large snags or coarse woody debris over 20 inches.

Prescription:
Commercial thin from below, removing the suppressed, intermediate, and a portion of the co-dominant crown classes to a residual basal area of 125 sq. ft. or about 136 trees/acre. Included in this treatment are about 2 acres of Riparian Reserve. Within the Riparian Reserve, maintain a 50 foot no cut buffer. Total harvest volume should be approximately 380 MBF. Handpile and burn or swamper burn slash in designated areas along the south and east property boundaries. Burn landing piles.

Silvicultural Prescription

Unit: 33-1 Date: 11/01
Legal Description: T3N,R3W,S33 Acres: ~12
Site Index: 128 (King) Land Designation: GFMA/RR
Riparian Reserve Width: 200 ft

Unit Summary

Species	TPA	QMD (Inches)	BA/Ac	SDI	RD	Bd Ft/Ac	Cubic Ft/Ac
DF	178	17	268		66	61,705	10,990
Alder	36	9	16		5	707	145
Cedar	10	5	1		1		
BL Maple	23	10	12		4	1,615	339
Total	246	15	298	471	77	64,028	11,474

Objectives:

1) Increase timber yields by converting this stand to a well-stocked conifer-dominated plantation.
2) Within the Riparian Reserves, commercially thin from below in order to increase radial growth rates, capture anticipated tree mortality, increase crown size, and promote the general health and vigor of the stand.
3) Remove pockets of trees infected with laminated root rot and a margin of trees around them in order to help keep the spread of this disease in check (outside Riparian Reserve).
4) Reforest infection centers with tree species resistant to laminated root rot.
5) In addition to meeting the Aquatic Conservation Strategy Objectives, the thinning treatments in the riparian reserves would attempt to:

- **$** Increase the vigor and radial growth of residual trees, thereby developing larger sized trees in a quicker time frame.
- **$** Increase live crown size.
- **$** Increase root system stability.
- **$** Increase vertical stand structure by allowing some trees to develop a greater degree of dominance over others.

Stand Conditions:
This stand is dominated by 60+ year old DF, with a rather inconsistent stocking pattern. Culmination of mean annual increment has recently occurred. It has an understory layer which is primarily bigleaf maple, red alder and western redcedar. Average crown closure is about 80%. The DF in the overstory have live crowns which are receding and radial growth rates which are declining. There are pockets of trees which are infected with laminated root rot, and associated recent dead DF and trees with declining crown conditions. There are older infection pockets that have become dominated by alder and bigleaf maple.

Brush and herbaceous species cumulatively cover over 100% of the land surface. Brush species include: vine maple, hazel, huckleberry, and ocean-spray. Herbaceous species include: dwarf Oregon grape, sword fern, salal, and bracken fern.

The soils are the Olyic and Goble series. Olyic soils are a fine loam overlying basalt 40 to 60 inches deep. It is considered to be well drained. Goble soils are a fine silty loess over old alluvium and fragipan. They are about 60 inches deep and are moderately well drained. Slopes are relatively moderate ranging from about 10% to 30%.

There is an average of approximately 15 class 2 snags per acre, but they are under 15 inches in diameter. Decay Class 2 coarse woody debris over 20 inches in diameter total 2.8 pieces and 710 feet per acre.

Prescription:
Regeneration cut, leaving 6 to 8 of the largest trees per acre for green tree retention requirements, plus 2 to 3 of the largest conifers per acre for snag recruitment. Also leave any existing conifer snags. Within the Riparian Reserves, commercial thin from below, removing the suppressed, intermediate, and a portion of the co-dominant crown classes to a residual basal area of 140 sq. ft. and about 98 trees/acre. In the Riparian Reserve, maintain a 50 foot no cut buffer, retain all hardwoods, and achieve an uneven spacing between leave trees. In the laminated root rot pockets outside of the Riparian Reserve, remove all conifers except western redcedar, plus bridge cut one tree width outside of the infection area. Handpile and burn slash or swamper burn slash in designated areas along the north and east property boundaries. Plant the infection centers with western redcedar and red alder. Plant the rest of the regneration area with a mixture of DF, western redcedar, and western heklock. This harvest should yield approximately 45 to 50 MBF per acre.

Silvicultural Prescription

Unit: 21-2 Date: 10/00
Legal Description: T2N,R2W,S21 Acres: ~36
Site Index: 124 (King) Land Designation: GFMA
Riparian Reserve Width: 200 ft

Unit Summary

Species	TPA	QMD (Inches)	BA/Ac	SDI	RD	Bd Ft/Ac	Cubic Ft/Ac
DF	142	16	203		50	39,532	7,334
Total	142	16	203		50	39,532	7,334

Objectives:

1) Reforest root rot infection centers with tree species resistant to laminated root rot.
2) Increase timber yields by converting hardwood stands and understocked mixed conifer/hardwood stands in to well-stocked conifer dominated plantations.
3) Retain a visual vegetative screen along Soleberger Road.
4) Reduce fuel loadings following harvest.

Stand Conditions:

This unit is dominated by poorly stocked DF, about 50 years old. It has an understory layer which is primarily bigleaf maple and vine maple. Average crown closure is about 85%. Laminated rot root is present in the stand, with some old infection areas which are now dominated by big leaf maple.

Brush and herbaceous species cumulatively cover about 88% of the land surface. Brush species include: vine maple, hazel, and salal. Herbaceous species include: sword fern, dwarf Oregon grape.

The soils are composed of the Saum series. These soils are fine silty loess/alluvium over residuum

weathered from basalt beginning at 40 to 60". It is considered to be well drained. Slopes are generally flat to moderate, up to about 20%.

There were no snags or coarse woody debris found in the stand exam plots.

Prescription:

Regeneration cut, leaving 6 overstory conifers plus 2 large maples per acre for green tree retention requirements, plus an additional 1 to 2 of the largest conifers per acre for snag recruitment, and another 4 trees per acre 26" dbh or larger for coarse woody debris recruitment. The coarse woody debris requirement of 240 lineal feet would be met based on an analysis of tree taper tables, allowing for 40 lineal feet being provided by each tree 26" dbh and 60 lineal feet provided by each tree larger than 26". Leave a 50 to 75 foot no cut buffer along both sides of the Soleberger Road. Pull slash within these buffer strips back into the unit. Total harvest volume should be approximately 25 MBF/ac. Plant a mixture of DF, grand fir, western red cedar, and western hemlock.

Silvicultural Prescription

Unit: 21-3 Date: 10/00
Legal Description: T2N,R2W,S21 Acres: ~20
Site Index: 113 (King) Land Designation: GFMA
Riparian Reserve Width: 150 ft

Unit Summary

Species	TPA	QMD (Inches)	BA/Ac	SDI	RD	Bd Ft/Ac	Cubic Ft/Ac
DF	42	19	84		19	16,981	3,083
WR Cedar	31	19	60		14	8,025	1,706
Hemlock	9	18	16		4	3,829	692
BL Maple	144	9	67		22	11,823	2,205
Alder	25	13	22		6	3,694	743
Total	257	13	250	391	68	44,351	8,429

Objectives:

1) Reforest root rot infection centers with tree species resistant to laminated root rot.
2) Increase timber yields by converting hardwood stands and understocked mixed conifer/hardwood stands into well-stocked conifer dominated plantations.

Stand Conditions:

This unit is dominated by an overstory of poorly stocked DF and some cedar and hemlock that varies from about 50 to 90 years old. It has a rather dense understory layer which is primarily composed of bigleaf maple and vine maple. Average crown closure is about 85%. Laminated rot root is present in the stand, with some old infection areas which are now dominated by big leaf maple.

Brush and herbaceous species cumulatively cover about 75% of the land surface. Brush species include: vine maple, hazel, and salal. Herbaceous species include: sword fern and dwarf

Oregon grape.

The soils are composed of the Goble series. These soils are fine silty loess over alluvium and fragipan, beginning at 30 to 45" and extending to 60". It is considered to be moderately well drained. Slopes vary from flat to about 40%.

There is an average of 1 snag per acre over 20". The stand exams show no coarse woody debris over 20" in diameter.

Prescription:
Regeneration cut, leaving 6 overstory conifers and 2 of the largest bigleaf maples per acre for green tree retention requirements, plus an additional 1 to 2 of the largest conifers per acre for snag recruitment, and another 4 trees per acre over 26" dbh for coarse woody debris recruitment. The 240 lineal feet of coarse wood requirement would be met based on an analysis of tree taper tables which allows for 40 lineal feet being provided by each tree 26" dbh and 60 lineal feet for trees 28 to 30" dbh. This harvest should result in approximately 17 MBF/ac being removed. Handpile and burn or swamper burn slash in designated areas along the Munson Road. Burn landing piles. Plant a mixture of DF, grand fir, western red cedar, and western hemlock.

Silvicultural Prescription

Unit: 17-1 Date: 10/00
Legal Description: T2N,R2W,S17 Acres: ~20
Site Index: 127 (King) Land Designation: GFMA/RR
Riparian Reserve Width: 200 ft

Unit Summary

Species	TPA	QMD (Inches)	BA/Ac	SDI	RD	Bd Ft/Ac	Cubic Ft/Ac
DF	133	16	186		48	40,083	7,341
Maple	72	6	12		5	1,758	393
WR Cedar	10	1	0		0	0	0
Total	214	13	198	326	56	41,841	7,734

Objectives:

1) Commercially thin from below in order to increase radial growth rates, capture anticipated tree mortality, increase crown size, and promote the general health and vigor of the stand.

2) In addition to meeting the Aquatic Conservation Strategy Objectives, the thinning treatments in the riparian reserves would attempt to:

- **$** Increase the vigor and radial growth of residual trees, thereby developing larger sized trees in a quicker time frame.
- **$** Increase live crown size.
- **$** Increase root system stability.
- **$** Increase vertical stand structure by allowing some trees to develop a greater degree of dominance over others.

Stand Conditions:
This stand is composed of densely stocked DF, about 55 years old. It has an understory layer which is primarily bigleaf maple and western redcedar. The DF in the overstory have live crowns which are beginning to recede and radial growth rates which are declining.

Brush and herbaceous species cumulatively cover about 66% of the land surface. Brush species include: vine maple, hazel, and rose. Herbaceous species include: sword fern, dwarf Oregon grape, bracken fern, and salal.

The soils are in the Kinton and Laurelwood series. The Kinton series is fine silty loess over old alluvium and fragipan, with a depth of about 60 inches. It is considered moderately well drained. The Laurelwood series is a fine silty loess overlying a moderately fine textured subsoil, which is above fine textured nonconforming materials beginning at 4 to 10 feet. It is considered well drained. Slopes are relatively moderate ranging from about 10% to 30%.

There is currently an average of 2 snags per acre over 20". No down coarse wood over 20" was recorded in the stand exam plots.

Prescription:
Commercial thin from below, removing the suppressed, intermediate, and a portion of the co-dominant crown classes to a residual basal area of 125 sq. ft. or about 78 trees/acre. In the Riparian Reserve, maintain a 50 foot no cut buffer, retain all hardwoods, and achieve uneven spacing between leave trees. This harvest should remove approximately 9 MBF/ac. Handpile and burn or swamper burn slash in designated areas along the north and east property boundaries. Burn landing piles.

Silvicultural Prescription

Unit: 15-1 Date: 9/00
Legal Description: T2N,R2W,S15 Acres: ~70
Site Index: 126 (King) Land Designation: GFMA/RR
Riparian Reserve Width: 220 ft

Unit Summary
Area A

Species	TPA	QMD (Inches)	BA/Ac	SDI	RD	Bd Ft/Ac	Cubic Ft/Ac
DF	117	16	117		49	37,047	6,442
BL Maple	48	11	32		10	5,418	1,109
R Alder	18	11	12		4	1,776	366
WR Cedar	10	9	4		1	388	97
Total	193	14	165	330	64	44,629	8,014

Area B

Species	TPA	QMD (Inches)	BA/Ac	SDI	RD	Bd Ft/Ac	Cubic Ft/Ac
DF	29	22	75		16	17,685	3,115
OGDF	4	33	22		4	5,697	902
Gnd Fir	32	12	26		7	5,665	902
WR Cedar	16	18	27		7	3,585	797
W Hemlock	31	11	19		6	4,578	793
R.Alder	37	10	20		6	1,388	295
BL Maple	30	13	28		8	4,843	995
Other HDW	9	8	2		0	0	0

Total	188	15	218	360	57	43,441	7,903

Objectives:

1) Commercially thin from below in order to increase radial growth rates, capture anticipated tree mortality, increase crown size, and promote the general health and vigor of the stand.
2) Remove pockets of trees infected with laminated root rot and a margin of trees around them in order to help keep the spread of this disease in check.
3) Reforest infection centers with tree species resistant to laminated root rot.
4) Increase timber yields by converting hardwood stands and understocked mixed conifer/hardwood stands in to well-stocked conifer dominated plantations.
5) In addition to meeting the Aquatic Conservation Strategy Objectives, the thinning treatments in the riparian reserves would attempt to:

- **$** Increase the vigor and radial growth of residual trees, thereby developing larger sized trees in a quicker time frame.
- **$** Increase live crown size.
- **$** Increase root system stability.
- **$** Increase vertical stand structure by allowing some trees to develop a greater degree of dominance over others.

Stand Conditions:
Area A
This portion of the unit is dominated by densely stocked DF, about 55 years old. It has an understory layer which is primarily bigleaf maple, red alder and western redcedar. Average crown closure is about 80%. The DF in the overstory have live crowns which are receding and radial growth rates which are declining.

Brush and herbaceous species cumulatively cover about 97% of the land surface. Brush species include: vine maple, huckleberry, and salmonberry. Herbaceous species include: sword fern, dwarf Oregon grape, and salal.

The soils are composed of the Cascade series. These soils are fine silty loess over old alluvium and fragipan. It is considered to be well drained. Depths range up to about 60 inches and they are considered to be moderately well drained. Slopes are generally flat to moderate, up to about 20%.

There are about 26 conifer snags per acre, but they are all under 20". There was no coarse woody debris recorded in the stand exam plots.

Prescription:
Commercial thin from below, removing the suppressed, intermediate, and a portion of the co-dominant crown classes to a residual basal area of 120 sq. ft. and about 95 trees/acre. In the Riparian Reserve, maintain a 50 foot no cut buffer, retain all hardwoods, and achieve an uneven spacing between leave trees. In the laminated root rot pockets outside of Riparian Reserve, remove all conifers except western redcedar, plus bridge cut one tree width outside of the

infection area. This harvest should result in the removal of approximately 10 MBF/ac within this portion of the unit. Within the root rot pockets, slash brush species greater than 2 feet in height. Plant the infection centers with western redcedar and red alder.

Stand Conditions:

Area B

This portion of the unit is dominated by an overstory composed of a few scattered large residual DF and a mixture of smaller, younger DF, hemlock, grand fir, and western red cedar, relatively under-stocked and about 55 years old. It has an understory layer which is primarily red alder and bigleaf maple. Average crown closure is about 78%. There is evidence of laminated root rot in the overstory DF, with recent snags and blowdown, as well as trees with declining crown conditions. Also, in the northeastern portion of the unit, there is English ivy established, which presents a serious reforestation problem unless it is adequately controlled.

Brush and herbaceous species cumulatively cover nearly 100% of the land surface. Brush species include: vine maple, huckleberry, and salmonberry. Herbaceous species include: sword fern, dwarf Oregon grape, and salal.

There were no snags or Decay Class 1 & 2 Coarse woody debris recorded in the stand exam plots. Decay Class 3 & 4 coarse woody debris over 20 inches in diameter total 8 pieces and 249 feet per acre.

Prescription:

Regeneration harvest, leaving an average of 10 of the largest conifers and 2 of the largest bigleaf maples per acre. The conifer leave trees would be greater than 26" dbh and will meet green tree retention, snag recruitment and coarse woody debris recruitment requirements. Included in these leave trees are about 3.6 trees per acre that are over 30" dbh which would each provide 80 lineal feet of CWD. This harvest should remove an average of approximately 20 MBF/ac. Handpile and burn or swamper burn slash in designated areas along property boundaries and county road R.O.W.-s. Burn landing piles. Plant the laminated root rot infection centers with western redcedar and red alder. Plant the remaining area with a mix of DF, western hemlock, grand fir, and western redcedar. Manual control of the English ivy in this unit will be essential for successful regeneration.

Silvicultural Prescription

Unit: 7-1 Date: 10/00
Legal Description: T2N,R2W,S7 Acres: ~50
Site Index: 121 (King) Land Designation: GFMA/RR
Riparian Reserve Width: 190 ft

Unit Summary

Species	TPA	QMD (Inches)	BA/Ac	SDI	RD	Bd Ft/Ac	Cubic Ft/Ac
DF	144	13	141		41	27,212	51,955
OGDF	5	36	34		6	8,419	1,320
Other Con	6	20	8		2	1,650	300
BL Maple	47	10	25		8	4,200	838
Alder	17	14	18		5	2,896	590
Total	219	14	232	375	63	44,698	8,220

Objectives:

1) Commercially thin from below in order to increase radial growth rates, capture anticipated tree mortality, increase crown size, and promote the general health and vigor of the stand.

2) In addition to meeting the Aquatic Conservation Strategy Objectives, the thinning treatments in the riparian reserves would attempt to:

- **$** Increase the vigor and radial growth of residual trees, thereby developing larger sized trees in a quicker time frame.
- **$** Increase live crown size.
- **$** Increase root system stability.
- **$** Increase vertical stand structure by allowing some trees to develop a greater degree of dominance over others.

Stand Conditions:
This stand is composed of densely stocked DF, about 50 years old with a few scattered large residual DFs. Total canopy cover is about 80%. It has an understory layer which is primarily

bigleaf maple and alder. There are some pockets of laminated root rot. The DF in the overstory have live crowns which are beginning to recede and radial growth rates which are declining.

Brush and herbaceous species cumulatively cover about 90% of the land surface. Brush species include: vine maple, hazel, huckleberry, ocean-spray, and rose. Herbaceous species include: sword fern, dwarf Oregon grape, bracken fern, and salal.

The soils are in the Goble and Cornelius series. Both of these series are a fine silty loess over old alluvium and fragipan beginning at 30 to 45" and extending to a depth of about 60 inches. They are considered moderately well drained. Slopes are relatively moderate to steep, ranging from about 10% to 70%.

The stand exams show no snags or coarse woody debris over 20".

Prescription:
Commercial thin from below, removing the suppressed, intermediate, and a portion of the co-dominant crown classes to a residual basal area of 120 sq. ft. or about 106 trees/acre. Retain hardwoods in the same proportion as they exist before treatment. Retain the old residual DF. Within Riparian Reserve, maintain a 50 foot no cut buffer, retain all hardwoods, and achieve an uneven spacing between leave trees. Bridge cut one tree width around laminated root rot centers and remove all susceptible species within the centers. This harvest should result in the removal of approximately 10 MBF/ac. Handpile and burn or swamper burn slash in designated areas along the north, east, and south property boundaries. Burn landing piles.